



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,681	12/06/2000	Roger A. Green		8188
26362	7590	08/23/2005	EXAMINER	
LOUIS J. HOFFMAN, P.C. 14614 NORTH KIERLAND BOULEVARD, SUITE 300 SCOTTSDALE, AZ 85254			GHULAMALI, QUTBUDDIN	
		ART UNIT	PAPER NUMBER	
				2637

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Supplemental Action
Office Action Summary

Application No.

09/730,681

Applicant(s)

GREEN ET AL.

Examiner

Qutub Ghulamali

Art Unit

2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 29 September 2004.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-28,34,41,50 and 52-73 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 25 and 26 is/are allowed.
- 6) Claim(s) 1-18,20-24,27,28,34,41,50 and 52-73 is/are rejected.
- 7) Claim(s) 19 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/01/04</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgment

1. This Office Action is responsive to the Amendment filed by the applicant on 09/29/2004.
2. This is a supplemental action issued in response to the office action dated 5/9/2005, mailed on 5/20/2005 withdrawing the Final Action.

Response to Arguments

3. Applicant's arguments filed 09/29/2004 have been fully considered but they are not persuasive. The Examiner has given due consideration to Applicant's arguments but firmly believes that the references cited (Office Action dated June 7, 2004) reasonably and properly meet the claimed limitations as rejected and therefore, respectfully disagrees with the Applicant's remarks.

Applicant's argument – “Ryan in view of Berthonis does not teach a first set of samples to a second modeled by a function of parameters including an estimate vector mismatch and a plurality of basis function” as recited in claims 1, 2, 27 28.

Examiner's response - Ryan, in fact, very clearly shows (abstract) comparing the current derived relative phase difference with a previous value of the relative phase difference that was derived from a prior measurement at the remote, of an earlier calibration burst, the base station than calculates a transmission correction to the plurality of antenna elements in response to comparing

step to minimize the difference between the first sample set and the second sample set (col. 2, lines 43-57).

The Examiner concludes therefore, Ryan clearly encompasses the limitations of claims 1,2, 27 and 28.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-8, 12, 13, 18, 20, 24, 27, 28, 34, 41, 50, 52, 58-60, 62, 63, 69 and 70-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Berthonis et al (“Berthonis”) (US Patent No. 6,625,222).

Consider claims 1, 18, 27, 28, 50 and 71, Ryan teaches a method for sequentially transmitting calibration bursts, the calibration bursts include a plurality of tone frequencies, (abstract; col. 2, lines 37-57) compares the current derived (first set) relative phase difference with a previous value (second set) of the relative phase difference that was derived from a prior measurement at the remote of an earlier calibration burst (matrix), the base station then calculates a transmission phase correction to the plurality of antenna elements in response to the comparing step, to minimize the relative phase differences (vector mismatch), combines as a composite calibration (col. 6, lines 33-43; col. 5, lines 53-60) between the plurality of traffic

bursts at the remote station (col. 2, lines 37-57). Ryan however, is silent regarding frequency translating the calibration signal to provide a first set of observed samples.

Bertonis discloses an apparatus for providing upstream data transmission, comprising: a frequency translator comprising an input node that is capable of accepting upstream signals in an upstream frequency band and an output node, said frequency translator processing said upstream signals to produce wireless upstream signals in one or more sub-bands at said output node (col. 10, lines 47-59). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include with Ryan's apparatus a frequency translator translating the calibration signal so as to minimize spreading and enhance transmission of signals as taught by Bertonis.

As per claims 34, 41, Ryan discloses every feature of the claimed invention, but does not explicitly disclose generating a local oscillator signal, a baseband calibration signal coupling them to a mixer (modulator) to provide an RF signal, and coupling the RF signal to one or more mixers (modulators) that during operation translate the RF signal using the local oscillator signal to at least one baseband calibration signal. Bertonis in a similar field of endeavor discloses (figs. 2, 4-6) local oscillator signal LO is produced by a voltage controlled oscillator (VCO) 33, the LO and the baseband signal IF is coupled to a mixer 32 to provide an RF signal and at the receiver side coupling the RF signal to a mixer 63 and translate the RF using the local oscillator LO to a baseband IF signal the antenna 39 is the output node of the frequency translator in the subscriber ODU (alternatively, a directional antenna may be used). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a local oscillator signal, a baseband calibration signal coupling them to a mixer

(modulator) to provide an RF signal, and coupling the RF signal to one or more mixers (modulators) that during operation translate the RF signal using the local oscillator signal to at least one baseband calibration signal as taught by Berthonis in the apparatus of Ryan so as to provide improved signal to noise ratio and coherency between the transmitter and the receiver (col. 8, lines 31-58).

As per claim 63, Ryan discloses the calibration signal further includes one or more aliases of at least one of the tones (col. 2, lines 14-19; col. 4, lines 65-67).

5. Claims 64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Berthonis et al (“Berthonis”) (US Patent No. 6,625,222) as applied to claim 64, and further in view of Lomp et al (US Patent 6,456,608).

Regarding claims 64, 64 and 68, Ryan and Berthonis in combination discloses all limitations to claim 64, but the combination is silent with reference to digital filter having deep but narrow frequency spectrum. Lomp in a similar field of endeavor discloses use of digital filters but does not explicitly show filter having deep and narrow spectrum. The use of filter in a specific application requirement and is conventionally design based. A digital filter with deep but narrow band can be easily designed wherein the undesired band (skirts) could fall outside the range of interest. Therefore, making it obvious to one of skill in the art to design a digital filter to meet the filtering requirements of the circuit or system.

As per claim 65, Ryan discloses digital values, consists of two digital values (binary value +1 and -1) and the calibration signal includes a tone having a frequency of one half the predetermined sample rate (col. 5, lines 22-34).

With reference to claim 68, Ryan discloses:

(a) an oscillator generate a baseband calibration signal including a fundamental tone and a plurality of harmonic tones (co-c15) at odd numbered multiples (c1, c3, c5...) of the fundamental tone frequency (fig. 1g; col. 5, lines 35-60; col. 8, lines 28-33). Ryan however fails to disclose a local oscillator generate a local oscillator signal, a mixer to provide an RF calibration signal, a frequency translation subsystem to provide one or more reduced frequency calibration signals and a digital filter. Bertronis in a similar field of endeavor discloses (figs. 2, 4-6) local oscillator signal LO is produced by a voltage controlled oscillator (VCO) 33, the LO and the baseband signal IF is coupled to a mixer 32 to provide an RF signal and at the receiver side coupling the RF signal to a mixer 63 and translate the RF using the local oscillator LO to a baseband IF signal the antenna 39 is the output node of the frequency translator in the subscriber ODU (alternatively, a directional antenna may be used). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a local oscillator signal, a baseband calibration signal coupling them to a mixer (modulator) to provide an RF signal, and coupling the RF signal to one or more mixers (modulators) that during operation translate the RF signal using the local oscillator signal to at least one baseband calibration signal as taught by Bertronis in the apparatus of Ryan so as to provide improved signal to noise ratio and coherency between the transmitter and the receiver (col. 8, lines 31-58). The Ryan and Bertronis combination however, does is silent regarding a digital filter coupled to the frequency translation subsystem, the filter having deep narrow nulls at the frequency of tones of the calibration signal. Lomp in a similar field of endeavor discloses the use of digital filters but does not explicitly show filter having deep and narrow spectrum. The use of filter in a specific application requirement and is conventionally design based. A

digital filter with deep but narrow band can be easily designed wherein the undesired band (skirts) could fall outside the range of interest. Therefore, making it obvious to one of skill in the art to design a digital filter to meet the filtering need in the combined circuit of Ryan and Bertonis.

6. Claims 66 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Alamouti et al (US Patent No. 5,933,421).

Regarding claim 66, Ryan discloses all of the claimed limitations but does not explicitly disclose converting digital values into analog values includes providing a plurality of preset multipliers each digital value corresponding to one of the multipliers. In a similar field of endeavor Alamouti discloses converting digital values into analog values includes providing a plurality of preset multipliers each digital value corresponding to one of the multipliers (col. 15, lines 64-67; col. 16, lines 1-13). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a plurality of multipliers at the D/A conversion as taught by Alamouti in the communication circuit of Ryan because it can provide better correlation of digital value.

Regarding claim 67, Ryan discloses:

- (a) the sequence of digital values (binary) includes one or more pairs of values having the same magnitude but opposite sign (col. 5, lines 22-34); and
- (b) each of the pair of values corresponds to one of the multipliers (col. 5, lines 25-34).

Regarding claim 2, Ryan discloses the remote station dispread the calibration signal 110 with an appropriate Hadamard matrix to yield an in-phase signal I1 and a quadrature Q1 signal and provides calibration frame forming vectors (col. 6, lines 10-67).

As per claim 3, Ryan discloses a method wherein:

- (a) the signal paths include a plurality of signal paths coupled to respective elements of a spatially selective array (col. 6, lines 45-57); and
- (b) vector mismatch includes deviation from a predetermined phase and amplitude relationship between each respective one of the plurality of signal paths, the deviations degrading spatial selectivity of the array (col. 6, lines 57-67; col. 7, lines 8-10).

Regarding claim 4, Ryan discloses transmitting the calibration signal through an antenna placed at a fixed (basestation) position with respect to the array elements (col. 8, lines 8-20).

As per claim 5, Ryan discloses the number of samples is greater than the number of parameters of the function, whereby the function is overdetermined (the sampling data message values also includes incoming link control as additional parameter value) (col. 2, lines 37-47).

Regarding claim 6, Ryan discloses substantially all claimed limitations (a) – (c) per claim 1 and further discloses: (d) statistically (arithmetic) combine the values of vector mismatch determined for each one of the plurality of first sample sets (col. 6, lines 58-67; col. 6, lines 1-8).

With reference to claim 7, Ryan discloses vector mismatch includes a first value representative of phase mismatch and a second value of gain representative of mismatches between the signal paths (abstract; col. 2, lines 27-36).

Regarding claim 8, Ryan discloses:

- (a) the determined vector mismatch includes a plurality of phase and gain mismatch values (abstract: col. 6, lines 39-44);

- (b) the plurality of values includes a phase and gain (magnitude signal to noise ratio) mismatch value for each one of the plurality of tones (col. 6, lines 57-67); and
- (c) each one of the plurality of values is representative of vector mismatch between the signal paths from frequency translation of one of the plurality of tones (col. 3, lines 65-67; col. 4, lines 1-37).

Regarding claim 12, Ryan discloses each one of the plurality of basis functions form an orthogonal basis for each one of the plurality of tones (col. 5, lines 26-67).

As per claim 13, Ryan discloses:

- (a) the plurality of basis function includes a first function set and a second function set (col. 2, lines 14-19); and
- (b) one basis function of the first function set and one basis function of the second set together form an orthogonal basis for each one of the plurality of tones (col. 2, lines 40-50).

Regarding claim 20, Ryan discloses applying at least one of a phase adjustment and a gain adjustment to at least one of the signal paths (col. 2, lines 41-57).

Regarding claim 24, Ryan discloses applying a phase and gain adjustment inverse of the determined vector mismatch to reduce the vector mismatch (col. 6, lines 58-67).

Regarding claim 52, Ryan discloses calibration signal (bursts) includes a plurality of tones (col. 4, lines 65-67).

Regarding claim 58, Ryan discloses every feature of the claimed invention but does not explicitly disclose the local oscillator signal and baseband calibration signal are derived from a high frequency output of a high stability master oscillator. Berthonis in a similar field of endeavor discloses the local oscillator signal and baseband calibration signal are derived from a high

frequency output of a high stability master oscillator (col. 5, lines 28-36). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a high stability master clock supply local oscillator signal and baseband signal as taught by Bertonis in the system of Ryan, so as to provide improved reference stability in signal.

Regarding claim 59, Ryan discloses every feature of the claimed invention but does not explicitly disclose providing a phase adjustor adjusting the phase of the local oscillator signal at the second mixer. Bertonis in a similar field of endeavor discloses:

(a) a phase adjustor between the local oscillator and the mixer (col. 8, lines 46-67); and
(b) adjusting the phase of the local oscillator signal at the second mixer to optimize the amplitude of the baseband calibration signal (col. 8, lines 59-67; col. 9, lines 1-19). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a phase adjustor adjusting the phase of the local oscillator signal at the second mixer as taught by Bertonis in the system of Ryan, because it can help in the optimization of baseband calibration signal.

Regarding claim 60, Ryan disclose every feature of the claimed invention but does not explicitly disclose a frequency translation subsystem translate radio frequency calibration signal to an in phase and a quadrature baseband signal and the phase of the local oscillator at the second mixer is adjusted to balance the in-phase and quadrature signals. Bertonis in a similar field of endeavor discloses:

(a) the frequency translation subsystem translate radio frequency calibration signal to an in phase and a quadrature baseband signal (col. 9, lines 54-60); and

Art Unit: 2637

(b) the phase of the local oscillator at the second mixer is adjusted to balance the amplitudes of the in-phase and quadrature baseband signals (col. 9, lines 56-67). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a frequency translation subsystem translate radio frequency calibration signal to an in phase and a quadrature baseband signal and the phase of the local oscillator at the second mixer is adjusted to balance the in-phase and quadrature signals as taught by Berthonis in the system of Ryan, because it can improve the reception of signals and maintain maximum performance of the translated signals.

Regarding claim 62, the steps claimed as a method is nothing more than restating the function of the specific components of the apparatus as claimed above with reference to claim 34 and therefore, it would have been obvious, considering the aforementioned rejection for the apparatus claim.

As per claim 69, the steps claimed as an apparatus is nothing more than restating the function of the specific components of the apparatus as claimed above with reference to claim 41 and therefore, it would have been obvious, considering the aforementioned rejection for the method claim 41.

Regarding claims 70, 72 and 73, the steps claimed as a method is noting more than restating the function of the specific components of the apparatus as claimed and therefore, it would have been obvious, considering the aforementioned rejection for the method claim 1.

7. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Berthonis et al (“Berthonis”) (US Patent No. 6,625,222) as applied to claims 1, 20 above and further in view of Lomp et al (US Patent 6,456,608).

With reference to claim 21, Ryan in combination with Bertonis discloses every feature of the claimed invention. Ryan and Bertonis combination however, is silent regarding computing complex exponentials, deriving coefficients of impulse response that is inversely representative of the vector mismatch and apply adjustment from a digital filter. Lomp in a similar field of endeavor discloses:

- (a) computing exponentials corresponding to the vector mismatch (col. 97, lines 45-67);
- (b) based on the complex exponentials, deriving coefficients of impulse response that is inversely representative of the vector mismatch (col. 98, lines 1-17); and
- (c) realizing the impulse response in a digital filter to apply the adjustment (col. 90, lines 1-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use complex exponentials, deriving coefficients of impulse response that is inversely representative of the vector mismatch and apply adjustment from a digital filter as taught by Lomp in the communication system of Ryan and Bertonis so as to provide greater stability and easy of design with discrete signals.

As per claim 22, Ryan in combination with Bertonis discloses every feature of the claimed invention but the combination is silent regarding coefficient are derived by applying the complex exponentials to appropriate frequency bands (col. 98, lines 38-48). Lomp in a similar field of endeavor discloses applying the complex exponentials to appropriate frequency bands (col. 23, lines 40-52; col. 99, lines 1-40). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use complex exponentials to appropriate frequency bands of an inverse fast Fourier transform as taught by Lomp in the communication system of Ryan and Bertonis so as to enhance in the recovery of signals.

Regarding claim 23, Ryan in combination with Bertronis discloses every feature of the claimed invention but the combination is silent regarding digital filter is a finite-impulse response filter. Lomp in a similar field of endeavor discloses digital filter is a finite-impulse response filter (col. 98, lines 1-17). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a finite impulse response digital filter as taught by Lomp in the combined system of Ryan and Bertronis because it can provide greater system stability and filter operation with discrete signals.

8. Claims 15 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Chen (US Patent No. 5,987,061).

Regarding claims 15 and 16 Ryan discloses every feature of the claimed invention but is silent with reference to difference in sample set is determined by recursive least mean squares constrained to a predetermined bounded region. Chen in the same field of endeavor discloses vector mismatch that minimizes the difference between the first sample set and the second is determined (performed) by least mean squares algorithm (col. 49, lines 50-58). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a least mean square adapting algorithm as taught by Chen in the communication system of Ryan so as to provide improved programmability and symmetry with the equalization process.

As per claim 17, Ryan discloses every feature of the claimed invention but is silent regarding value determined by recursive least squares with an exponential forgetting window. Chen in the same field of endeavor discloses a programmable filter (1514) with adjustable coefficients (1516) wherein adapting is performed by a least mean squares algorithm (col. 49, lines 50-58). It would have been obvious to a person of ordinary skill in the art at the time the

invention was made to include a least mean square adapting algorithm as taught by Chen in the apparatus of Ryan and Bertronis because it can improve programmability and symmetry with the equalization process.

9. Claims 9, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Parl et al (US Patent No. 5,883,598).

Regarding claims 9, 10 and 11, Ryan discloses all of the claimed limitations. Ryan however, is silent regarding temperature being a parameter with the local oscillator drift due to temperature. Parl in a similar field of endeavor discloses reference tone generator parameter further includes a temperature environmental condition with the local oscillator. It would have been obvious to one of ordinary skill in the art at the time the invention was made to indicate temperature as a parameter in the local oscillator as taught by Parl in the communication system of Ryan so as to avoid or mitigate frequency drift due to temperature in received signals (col. 9, lines 35-54; col. 10, lines 6-22).

10. Claims 53 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Bertronis et al (“Bertronis”) (US Patent No. 6,625,222) as applied to claim 28 above, and further in view of Chen (US Patent No. 5,987,061).

Regarding claims 53 and 54, the Ryan and Bertronis combination disclose every feature of the claimed invention but is silent with reference to “adapting is performed by a least mean squares algorithm”. Chen in the same field of endeavor discloses a programmable filter 1514 with adjustable coefficients 1516 wherein adapting is performed by a least mean squares algorithm (col. 49, lines 50-58). It would have been obvious to a person of ordinary skill in the

Art Unit: 2637

art at the time the invention was made to include a least mean square adapting algorithm as taught by Chen in the apparatus of Ryan and Bertonis so as to provide improved programmability and symmetry with the equalization process.

11. Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Chen (US Patent No. 5,987,061).

Regarding claim 55, Ryan discloses a signal processing system having a plurality of signal paths (calibration bursts) comprising:

(a) a calibration signal subsystem that during operation provides a periodic calibration signal that includes a plurality of tones (Abstract; col. 2, lines 44-57; col. 4, lines 65-67);
(b) a digital subsystem responsive to the calibration signal to provide a first and second set of observed samples derived from first and second ones of signal paths (col. 2, lines 37-55). Ryan however, is silent regarding second samples derived through an adaptive filter having coefficients adapted by a bounded least mean squares algorithm to minimize the difference between samples set. Chen in a similar field of endeavor discloses a data communications system wherein during operation:

(1) the second sample set is derived through an adaptive filter (1514) having a set of adaptable coefficients (1516) (col. 49, lines 48-58); and
(2) the coefficients are adapted by a bounded least mean squares (LMS) algorithm to minimize the difference between sample set (col. 49, lines 53-56; col. 50, lines 5-16). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an adaptive filter with adaptive coefficients using LMS algorithm as taught by Chen in the system

on Ryan because it can enhance the spectral density and minimize the difference between samples.

Regarding claim 56, the steps claimed as a method is noting more than restating the function of the specific components of the apparatus as claimed above and therefore, it would have been obvious, considering the aforementioned rejection for the apparatus claim 55.

12. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ryan (US Patent No. 6,134,261) in view of Berthonis et al (“Berthonis”) (US Patent No. 6,625,222) as applied to claim 34 above, and further in view of Newberg et al (US Patent No. 5,353,033).

Regarding claim 57, Ryan and Berthonis combination discloses every feature of the claimed invention. However, the combination is silent regarding a plurality of array elements transmitting the radio frequency calibration signal through an antenna placed at a fixed position with respect to the array. Newberg in a similar field of endeavor discloses:

(a) providing a plurality of array elements responsive to radio frequency electromagnetic signals (col. 3, lines 44-55); and

(b) transmitting the radio frequency calibration signal through an antenna placed at a fixed position with respect to the array elements wherein the radio frequency calibration signal is coupled to each mixer through the respective array elements (col. 6, lines 66-67; col. 7, lines 1-15). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a plurality of array elements transmitting the radio frequency calibration signal through an antenna placed at a fixed position with respect to the array as taught by Newberg with the combined features of Ryan and Berthonis so as to reduce alignment and calibration signal losses.

Allowable Subject Matter

13. Claims 25 and 26, allowed.
14. Claim 19 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patents:

Clark et al (US Patent 5,937,006 discloses a frequency translating device transmission response method determine the amplitude and phase of transmission response.

Behzad (US Patent 6,759,904) shows an integrated receiver with channel selection with PLL signals.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-3014. The examiner can normally be reached on Monday-Friday from 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

QG.
August 16, 2005.



JAY K. PATEL
SUPERVISORY PATENT EXAMINER